NOV 03 2005
PATENT & TRADEMARK OFFICE

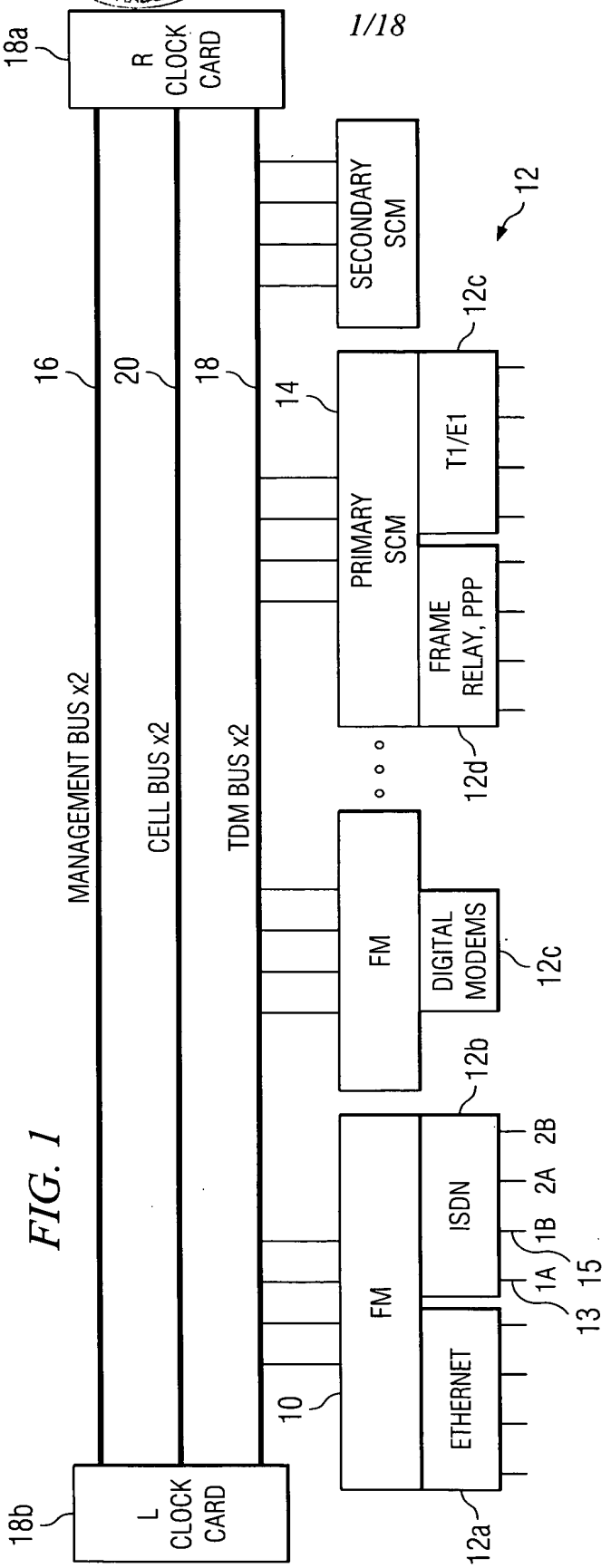


FIG. 1

FIG. 2

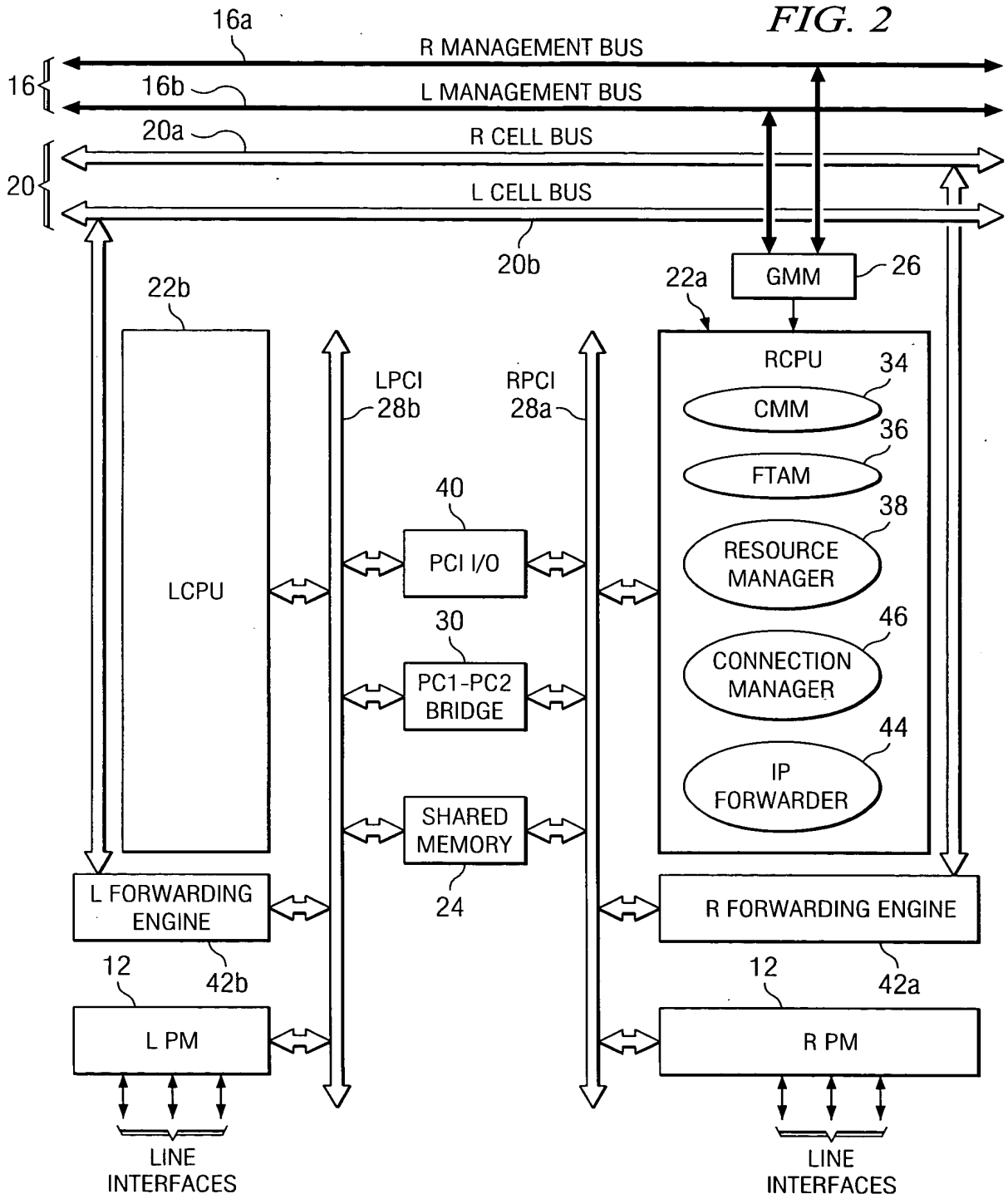

16a
R MANAGEMENT BUS
16
16b
L MANAGEMENT BUS
20a
R CELL BUS
20
L CELL BUS
20b
22b
22a
GMM
26
LPCI
28b
RPCI
28a
RCPU
34
CMM
36
FTAM
40
38
RESOURCE MANAGER
PCI I/O
LCPU
30
46
CONNECTION MANAGER
PC1-PC2 BRIDGE
44
IP FORWARDER
SHARED MEMORY
24
L FORWARDING ENGINE
R FORWARDING ENGINE
12
42b
12
42a
L PM
R PM
LINE INTERFACES
LINE INTERFACES

FIG. 3

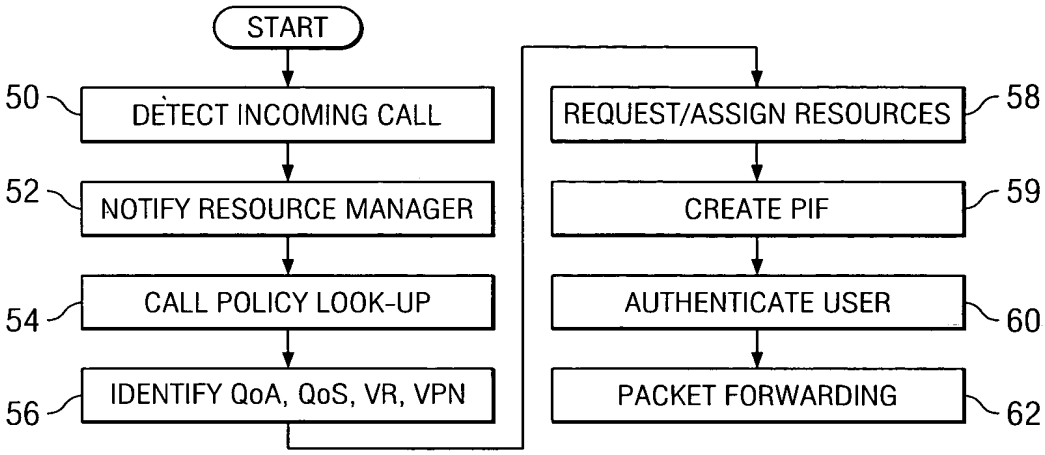
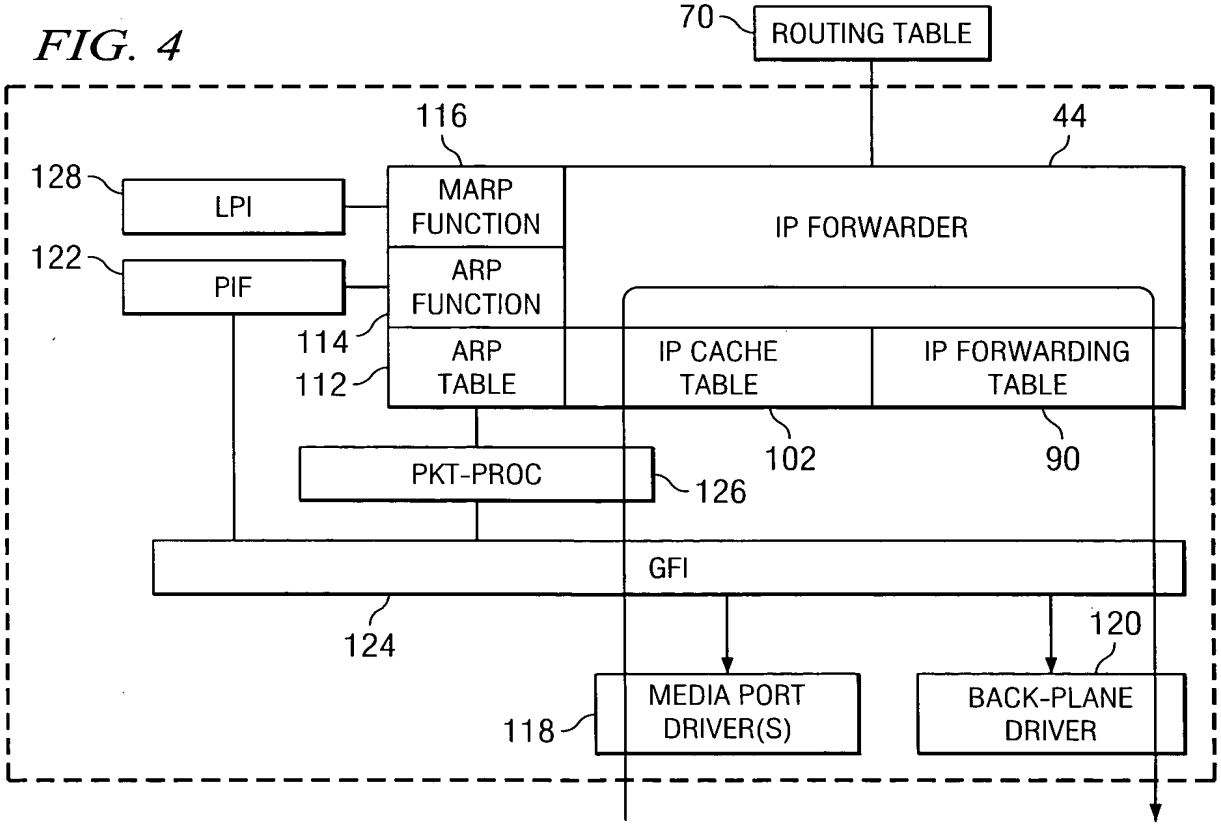

START
50
DETECT INCOMING CALL
52
NOTIFY RESOURCE MANAGER
54
CALL POLICY LOOK-UP
56
IDENTIFY QoA, QoS, VR, VPN
58
REQUEST/ASSIGN RESOURCES
59
CREATE PIF
60
AUTHENTICATE USER
62
PACKET FORWARDING

FIG. 4


70
ROUTING TABLE
116
44
128
LPI
MARP FUNCTION
IP FORWARDER
122
PIF
ARP FUNCTION
114
ARP TABLE
112
IP CACHE TABLE
IP FORWARDING TABLE
102
90
PKT-PROC
126
GFI
124
120
118
MEDIA PORT DRIVER(S)
BACK-PLANE DRIVER

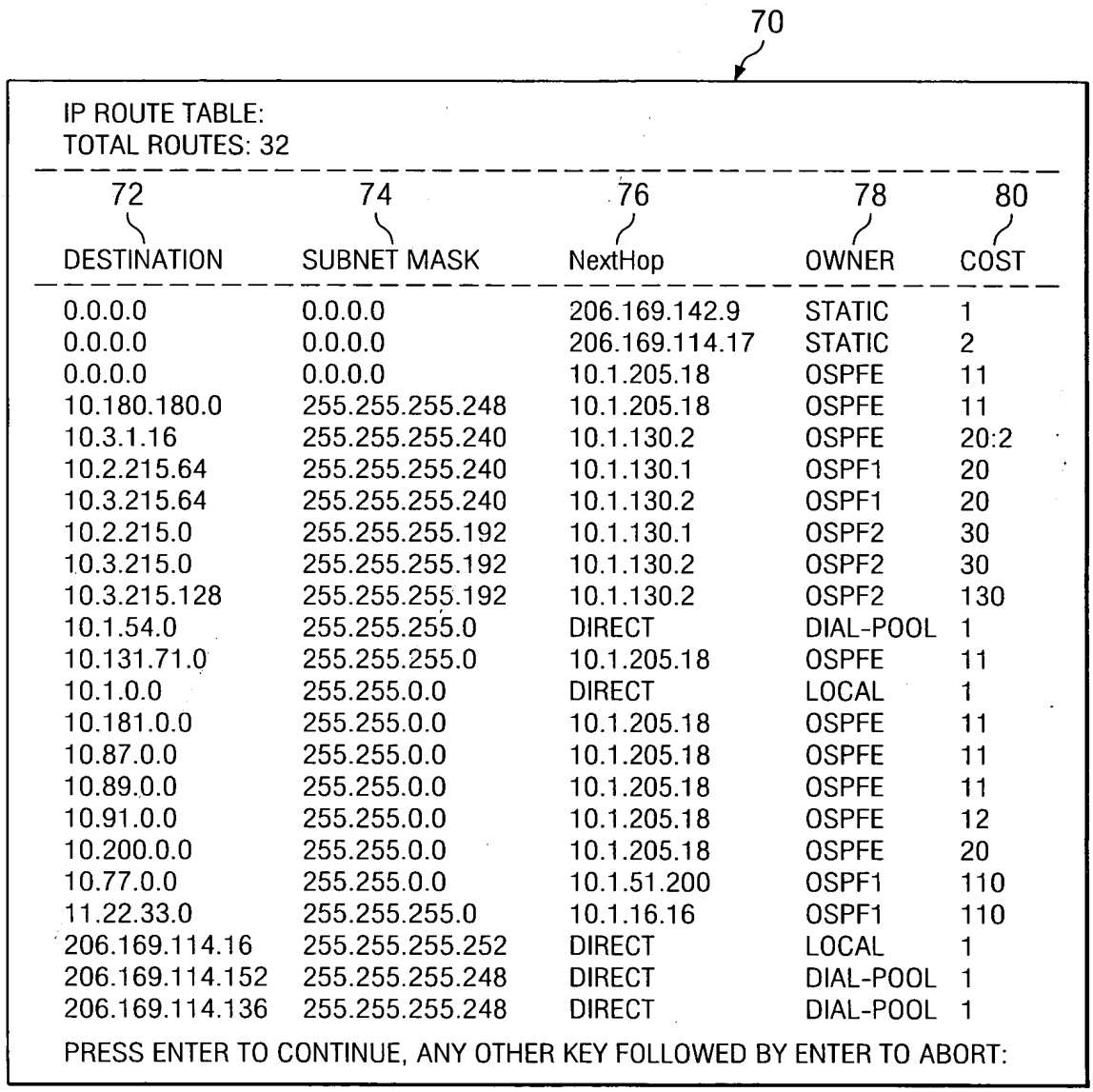

70
IP ROUTE TABLE:
TOTAL ROUTES: 32
72
74
76
78
80
DESTINATION
SUBNET MASK
NextHop
OWNER
COST
0.0.0.0 0.0.0.0 206.169.142.9 STATIC 1
0.0.0.0 0.0.0.0 206.169.114.17 STATIC 2
0.0.0.0 0.0.0.0 10.1.205.18 OSPFE 11
10.180.180.0 255.255.255.248 10.1.205.18 OSPFE 11
10.3.1.16 255.255.255.240 10.1.130.2 OSPFE 20:2
10.2.215.64 255.255.255.240 10.1.130.1 OSPF1 20
10.3.215.64 255.255.255.240 10.1.130.2 OSPF1 20
10.2.215.0 255.255.255.192 10.1.130.1 OSPF2 30
10.3.215.0 255.255.255.192 10.1.130.2 OSPF2 30
10.3.215.128 255.255.255.192 10.1.130.2 OSPF2 130
10.1.54.0 255.255.255.0 DIRECT DIAL-POOL 1
10.131.71.0 255.255.255.0 10.1.205.18 OSPFE 11
10.1.0.0 255.255.0.0 DIRECT LOCAL 1
10.181.0.0 255.255.0.0 10.1.205.18 OSPFE 11
10.87.0.0 255.255.0.0 10.1.205.18 OSPFE 11
10.89.0.0 255.255.0.0 10.1.205.18 OSPFE 11
10.91.0.0 255.255.0.0 10.1.205.18 OSPFE 12
10.200.0.0 255.255.0.0 10.1.205.18 OSPFE 20
10.77.0.0 255.255.0.0 10.1.51.200 OSPF1 110
11.22.33.0 255.255.255.0 10.1.16.16 OSPF1 110
206.169.114.16 255.255.255.252 DIRECT LOCAL 1
206.169.114.152 255.255.255.248 DIRECT DIAL-POOL 1
206.169.114.136 255.255.255.248 DIRECT DIAL-POOL 1
PRESS ENTER TO CONTINUE, ANY OTHER KEY FOLLOWED BY ENTER TO ABORT:

FIG. 5

90

PRI-SCM: 1.1>=2:netman:ip# view ipf
IP FORWARDING TABLE:
TOTAL IPF TABLE ENTRIES: 12

92 DESTINATION	94 SUBNET MASK	96 NextHop	98 TYPE	100 FLAGS(*)
10.3.238.1	255.255.255.255.255		SPORT	SD(R)
10.1.6.36	255.255.255.255.255		SPORT	M
10.1.6.35	255.255.255.255.255		SPORT	M
10.1.6.34	255.255.255.255.255		SPORT	M
10.1.6.33	255.255.255.255.255		SPORT	M
10.1.6.32	255.255.255.255.255		SPORT	M
10.1.6.31	255.255.255.255.255		SPORT	M
10.2.238.1	255.255.255.255.255		SPORT	SD(L)
10.1.6.30	255.255.255.255.255		SPORT	SD(L)
10.3.0.0	255.255.0.0		SPORT	PD(R)
10.2.0.0	255.255.0.0		SPORT	PD(L)
10.1.0.0	255.255.0.0		SPORT	PD(L)
0.0.0.0	0.0.0.0	206.169.142.9	SPORT	R

(*) D: DIRECT (AND L=LOCAL CARD ONLY, R=REMOTE CARD ONLY),
S: SYSTEM I/F, R: REMOTE, P: SUPERNET, F: DEFAULT AND M: MGMT

ACTUAL IPF TABLE ENTRIES: 12

FIG. 6

102

TOTAL IP CACHE ENTRIES: 3

104 DESTINATION	106 SOURCE	108 OUT PORT	110 HEADER
207.200.77.45	206.169.114.138	Fr.1.5.2.3.1	08001000cea97211
206.169.114.	142.10.1.1.25	Mo.1.3.1.1.29	0800201dcea9728e
198.41.0.5	206.169.114.138	Fr.1.5.2.3.1	08000000cea97211

FIG. 7

112

FIG. 8

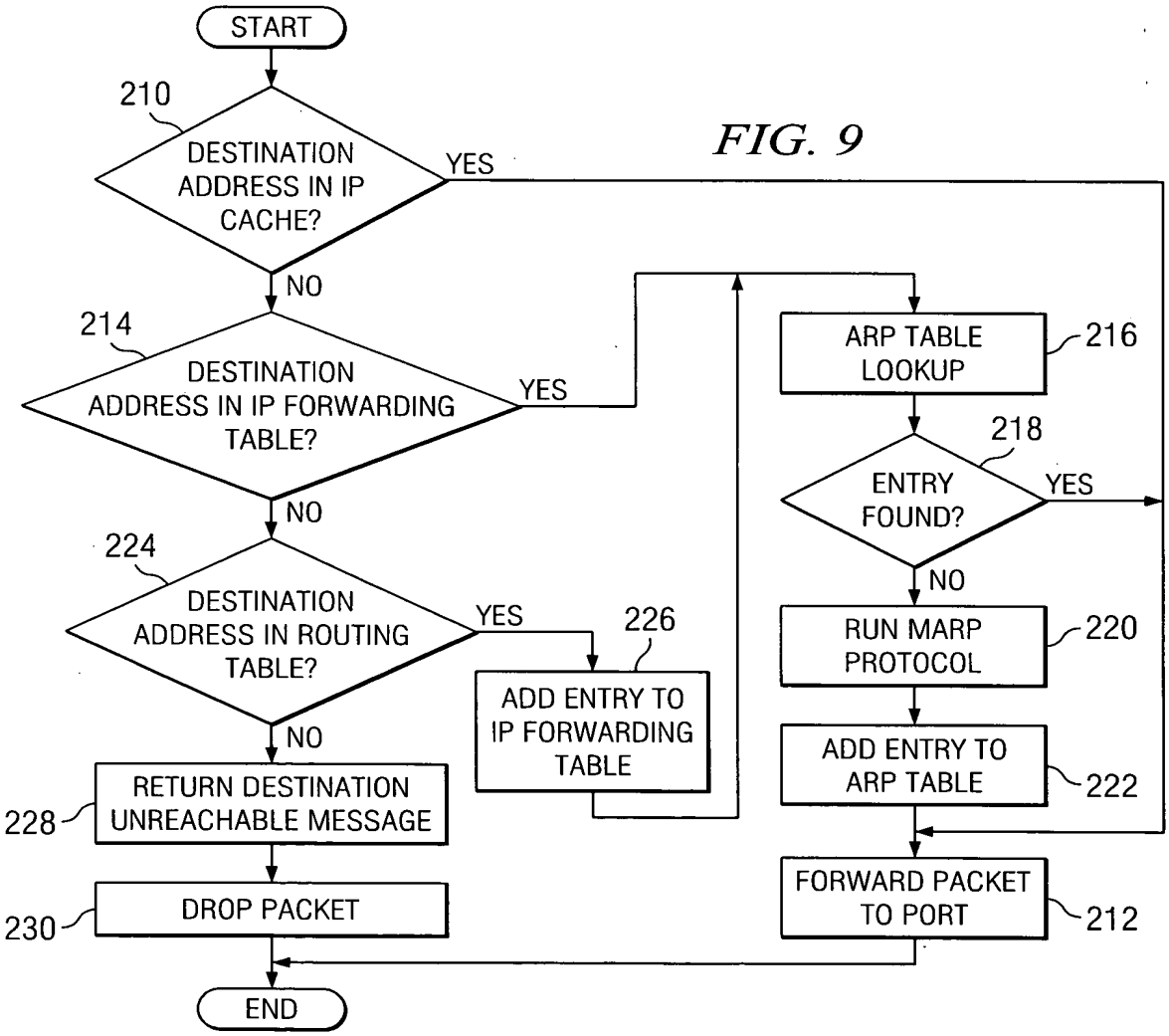
IP ARP TABLE:

200 IP ADDRESS	202 MAC ADDRESS	204 PHYSICAL PORT	206 TYPE(*)
10.1.1.101	00-ff-4a-3d-2f-1a	En.1.3.1.1.1.	S
10.1.5.100	00-ff-ff-01-ff-20	En.1.3.2.1.1.	D
150.140.140.30	08-00-09-ff-65-ff	En.1.3.1.1.14	LB
147.128.128.60	08-00-09-ff-38-38	En.1.3.1.1.10	D
10.1.5.109	00-ff-ff-04-02-ff	En.1.3.2.1.8	S

(*) R: RMT, L: LCL, D: DYN, S: STAT, P: Pt2Pt, T: ROUTE AND B: BCAST

TOTAL ARP TABLE ENTRIES: 5

FIG. 9



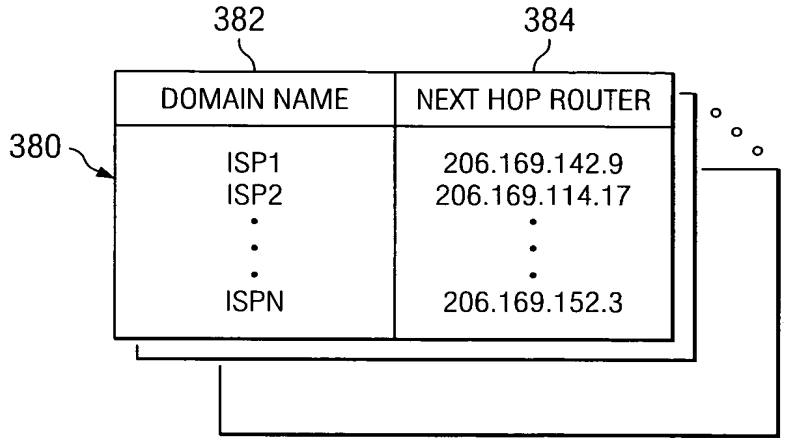

382
384
DOMAIN NAME
NEXT HOP ROUTER
380
ISP1
ISP2
ISPN
206.169.142.9
206.169.114.17
206.169.152.3

FIG. 10

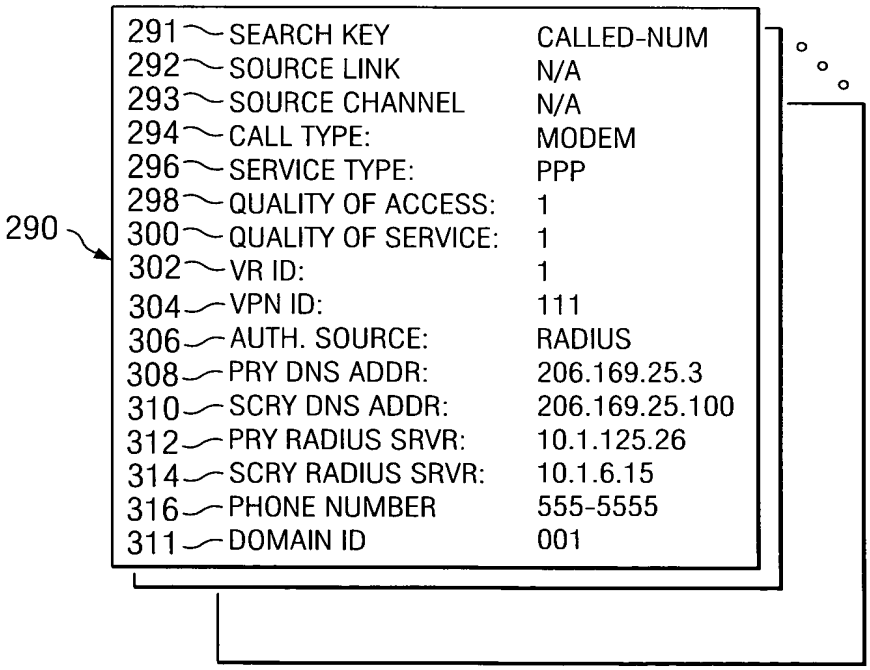

290
291 SEARCH KEY CALLED-NUM
292 SOURCE LINK N/A
293 SOURCE CHANNEL N/A
294 CALL TYPE: MODEM
296 SERVICE TYPE: PPP
298 QUALITY OF ACCESS: 1
300 QUALITY OF SERVICE: 1
302 VR ID: 1
304 VPN ID: 111
306 AUTH. SOURCE: RADIUS
308 PRY DNS ADDR: 206.169.25.3
310 SCRY DNS ADDR: 206.169.25.100
312 PRY RADIUS SRVR: 10.1.125.26
314 SCRY RADIUS SRVR: 10.1.6.15
316 PHONE NUMBER 555-5555
311 DOMAIN ID 001

FIG. 11

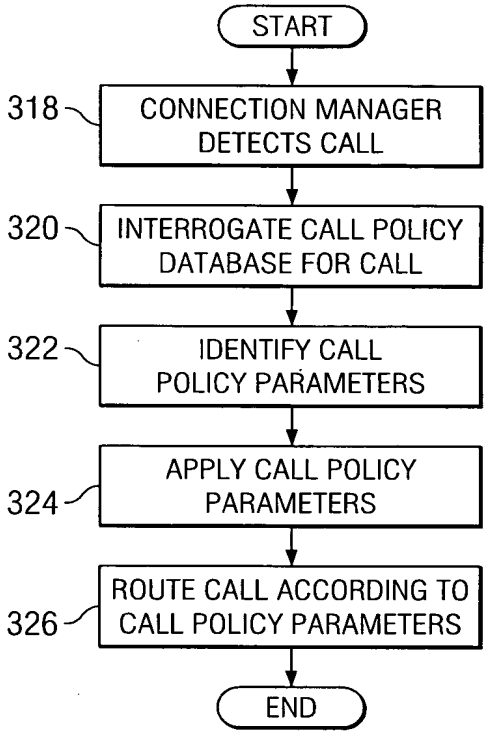


FIG. 12

328 330

332

QoA LEVEL	ACCESS THRESHOLD
1	100%
2	75%
3	50%
4	25%

FIG. 13

FIG. 14

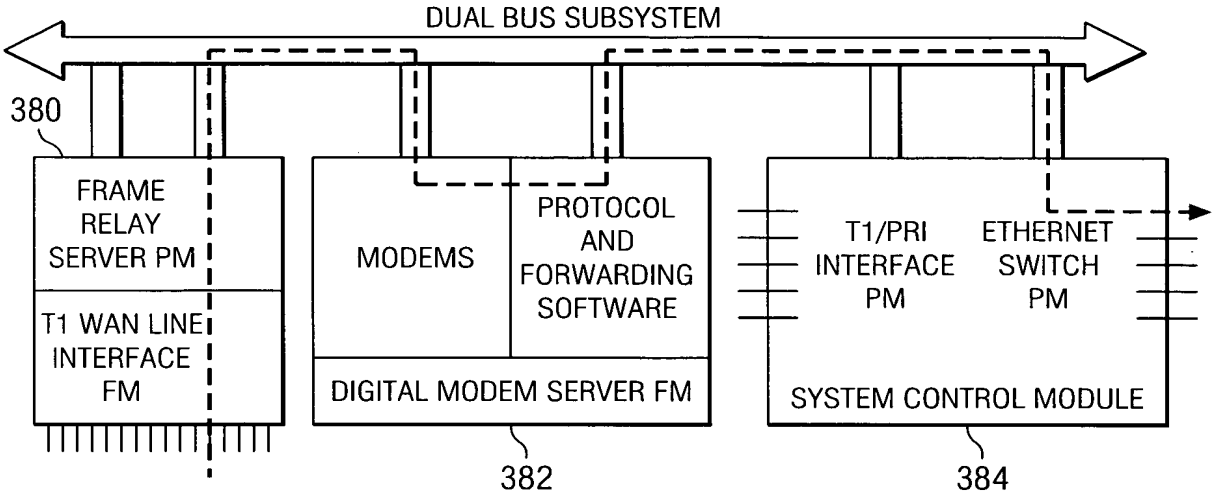


FIG. 15

334

MODEM RESOURCES

336	VR ID	=111
338	MAX LOCAL RESOURCES	=32
340	MAX GLOBAL RESOURCES	=32
342	CURRENT LOCAL RESOURCES	=29
344	CURRENT GLOBAL RESOURCES	=29

346 QOA	348 LOCAL QOA	350 GLOBAL QOA	352 ACCEPT LOCAL	354 ACCEPT GLOBAL
1	0	0	YES	YES
2	8	8	YES	YES
3	16	16	YES	YES
4	24	24	YES	YES

FIG. 16

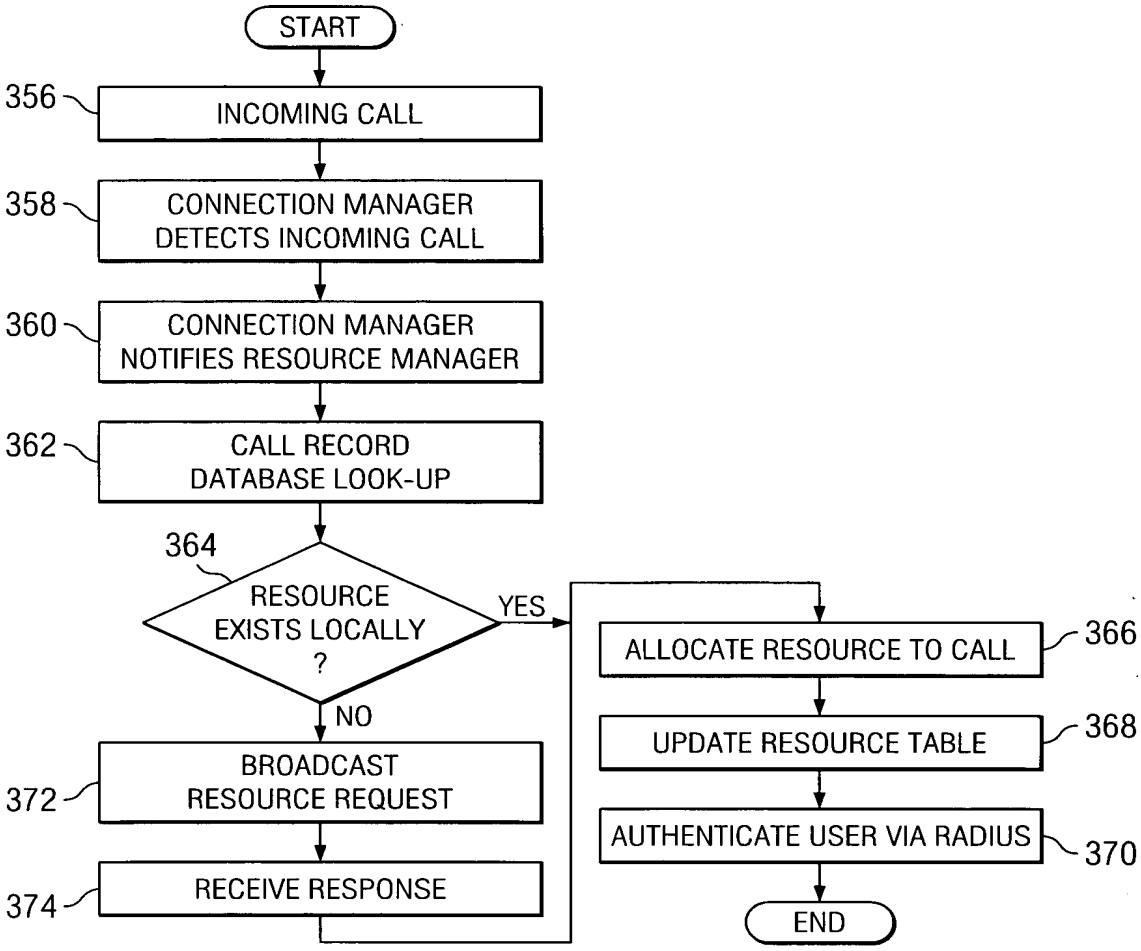
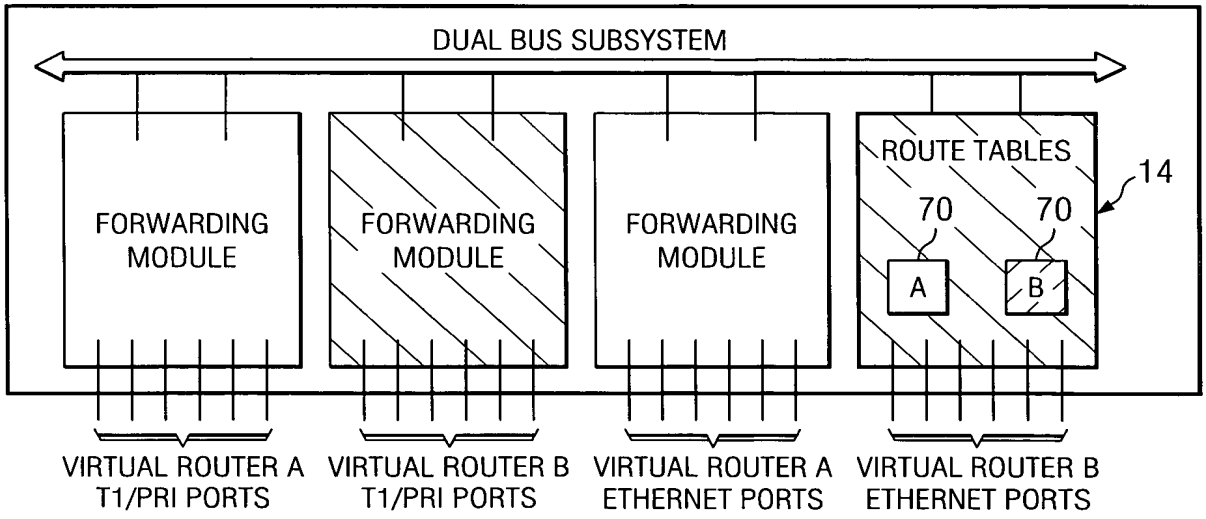

START
356
INCOMING CALL
358
CONNECTION MANAGER DETECTS INCOMING CALL
360
CONNECTION MANAGER NOTIFIES RESOURCE MANAGER
362
CALL RECORD DATABASE LOOK-UP
364
RESOURCE EXISTS LOCALLY ?
YES
NO
ALLOCATE RESOURCE TO CALL
366
UPDATE RESOURCE TABLE
368
AUTHENTICATE USER VIA RADIUS
370
END
372
BROADCAST RESOURCE REQUEST
374
RECEIVE RESPONSE

FIG. 17


DUAL BUS SUBSYSTEM
FORWARDING MODULE
FORWARDING MODULE
FORWARDING MODULE
ROUTE TABLES
14
70
70
A
B
VIRTUAL ROUTER A T1/PRI PORTS
VIRTUAL ROUTER B T1/PRI PORTS
VIRTUAL ROUTER A ETHERNET PORTS
VIRTUAL ROUTER B ETHERNET PORTS

240

IP VPN SESSIONS:

242 ID	244 VPN-ID	246 SOURCE-ADDR	248 SOURCE-MASK	250 DEST-ADDR	252 DEST-MASK
1	111	ANY	ANY	10.1.0.0	255.255.0.0
2	ANY	10.1.0.0	255.255.0.0	208.227.214.0	255.255.255.0
3	ANY	10.1.0.0	255.255.0.0	10.1.0.0	255.255.0.0
4	ANY	10.1.0.0	255.255.0.0	206.169.114.128	225.255.255.192
5	ANY	ANY	ANY	10.1.0.0	255.255.0.0
6	ANY	10.1.0.0	255.255.0.0	ANY	ANY
7	ANY	ANY	ANY	ANY	ANY

FIG. 18

254

PRI-SCM: 1.2>=14:netman:ip#

IP VPN RULES:

256 ID	258 PRI	260 ACTION	262 IP-PROTO	264 APP-PROTO	266 SessCnt	268 PKT COUNT
1	1	FWD	TCP	FTP	5	3939981
2	1	DROP	ALL	—	2	3

PRI-SCM: 1.2>=14:netman:ip#

FIG. 19

PRI-SCM:1.1>=3:netman:ip# view ppn-filter
IP VPN LIST OF RULES ATTACHED TO SESSIONS:

272 SessID	274 RULE LIST (IN ORDER OF PRIORITY)
1	1
2	1
3	1
4	1
5	2
6	2
7	1

PRI-SCM:1.1>=4:netman:ip#

270

FIG. 20

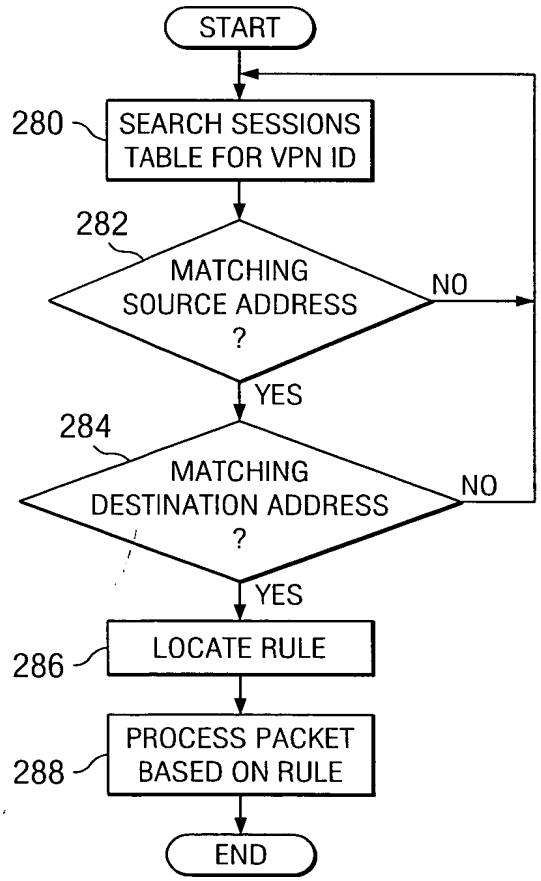


FIG. 21

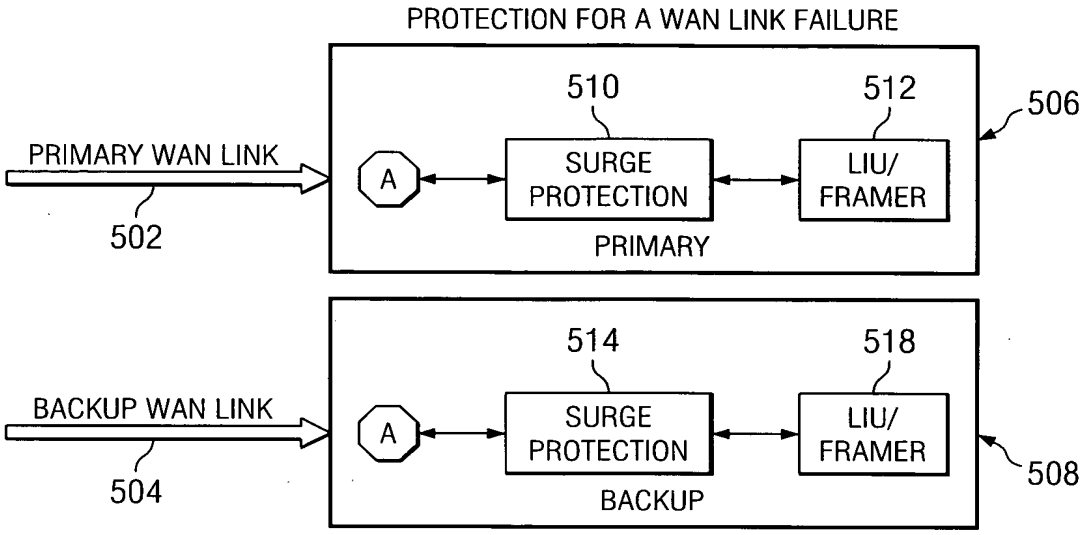

PROTECTION FOR A WAN LINK FAILURE
PRIMARY WAN LINK
502
A
510
SURGE PROTECTION
512
LIU/ FRAMER
PRIMARY
506
BACKUP WAN LINK
504
A
514
SURGE PROTECTION
518
LIU/ FRAMER
BACKUP
508

FIG. 22

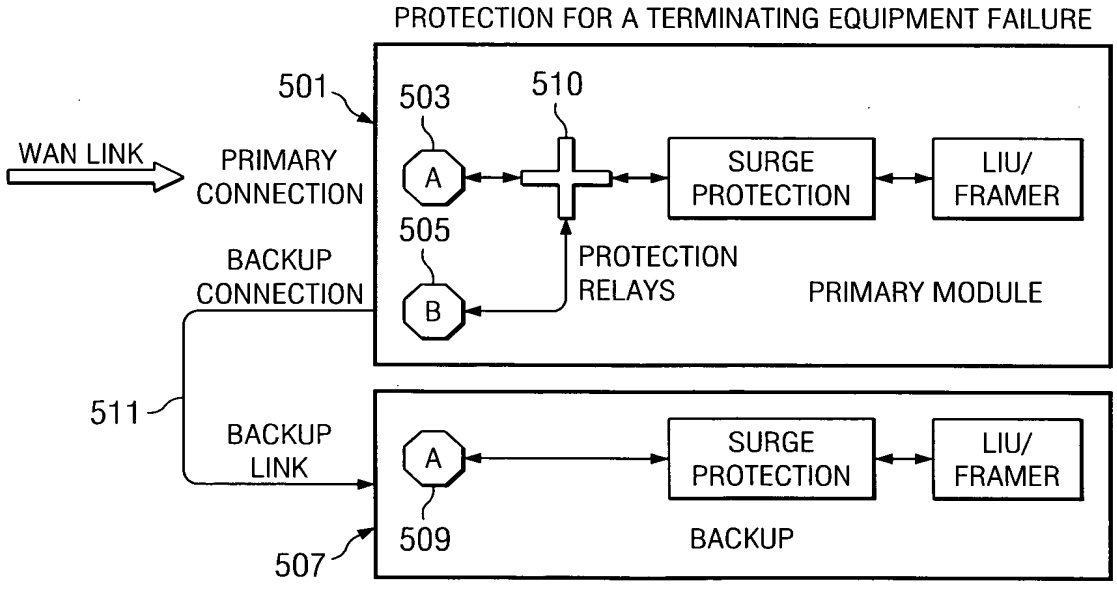

PROTECTION FOR A TERMINATING EQUIPMENT FAILURE
WAN LINK
PRIMARY CONNECTION
BACKUP CONNECTION
511
BACKUP LINK
501
503
A
505
B
510
PROTECTION RELAYS
SURGE PROTECTION
LIU/ FRAMER
PRIMARY MODULE
A
509
SURGE PROTECTION
LIU/ FRAMER
BACKUP
507

FIG. 23

FIG. 24

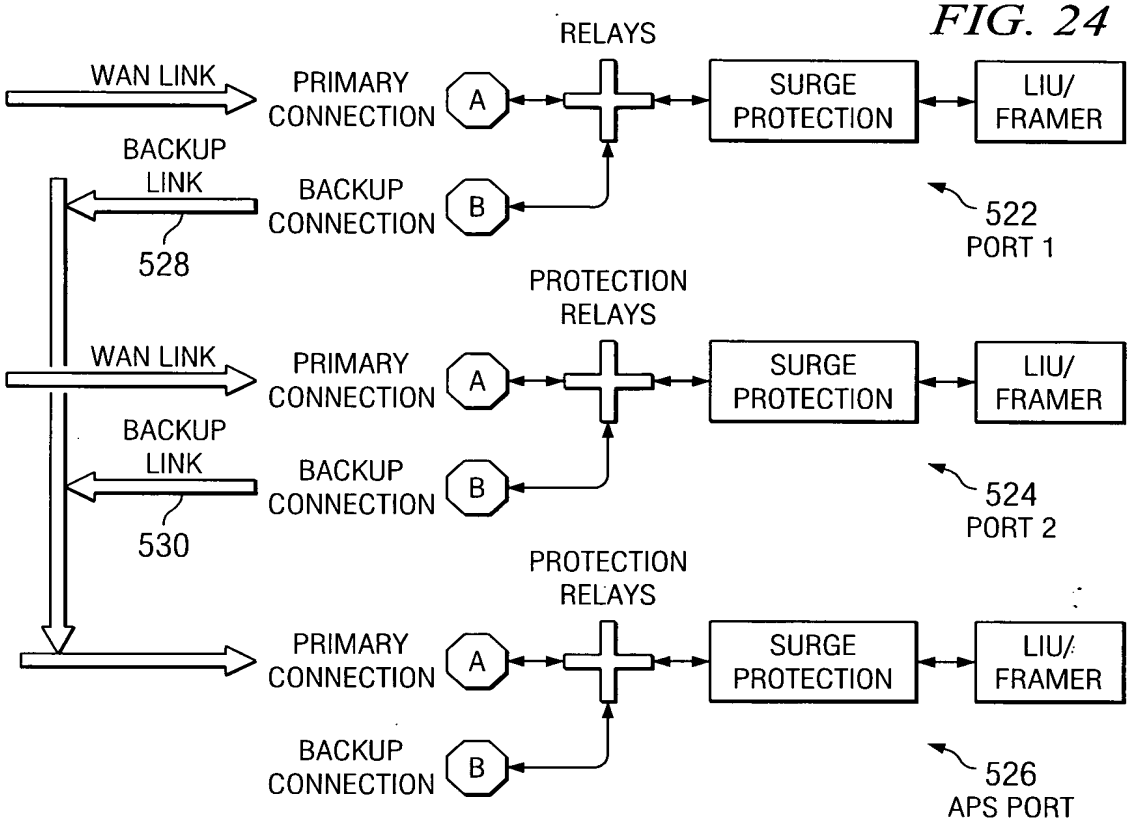
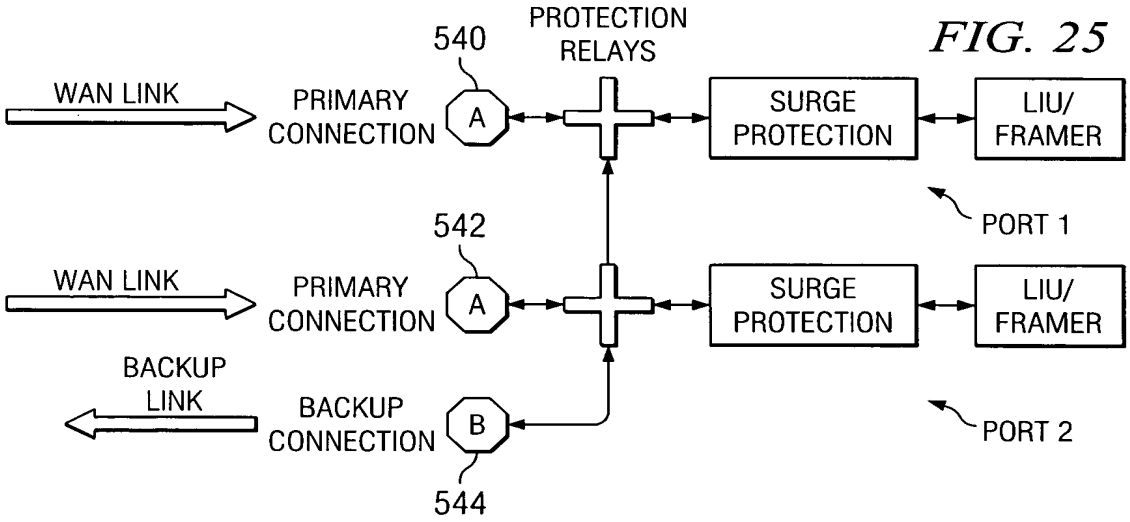

RELAYS
WAN LINK
PRIMARY CONNECTION
A
SURGE PROTECTION
LIU/ FRAMER
BACKUP LINK
BACKUP CONNECTION
B
528
522 PORT 1
PROTECTION RELAYS
WAN LINK
PRIMARY CONNECTION
A
SURGE PROTECTION
LIU/ FRAMER
BACKUP LINK
BACKUP CONNECTION
B
530
524 PORT 2
PROTECTION RELAYS
PRIMARY CONNECTION
A
SURGE PROTECTION
LIU/ FRAMER
BACKUP CONNECTION
B
526 APS PORT

FIG. 25


540
PROTECTION RELAYS
WAN LINK
PRIMARY CONNECTION
A
SURGE PROTECTION
LIU/ FRAMER
PORT 1
542
WAN LINK
PRIMARY CONNECTION
A
SURGE PROTECTION
LIU/ FRAMER
BACKUP LINK
BACKUP CONNECTION
B
PORT 2
544

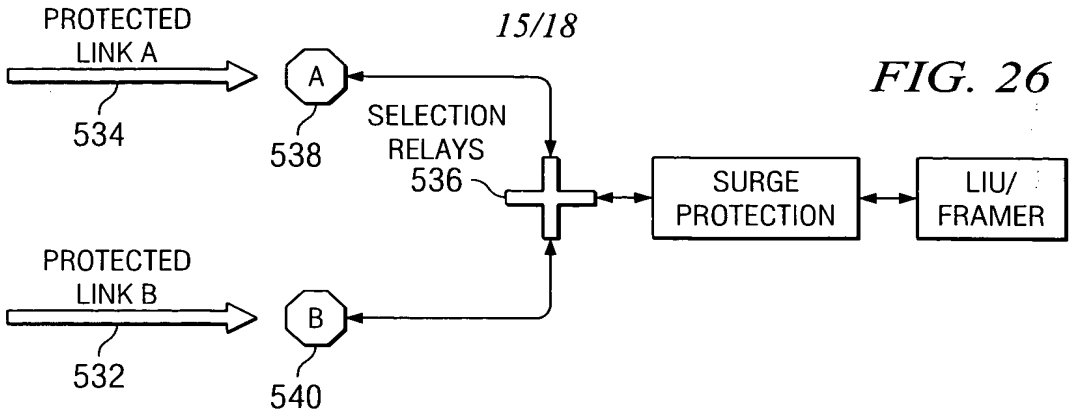


FIG. 26

FIG. 27

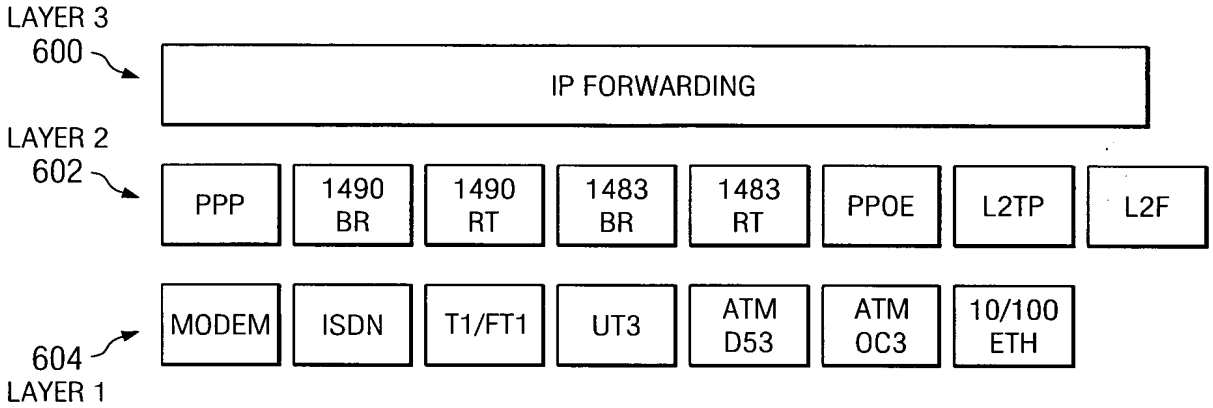
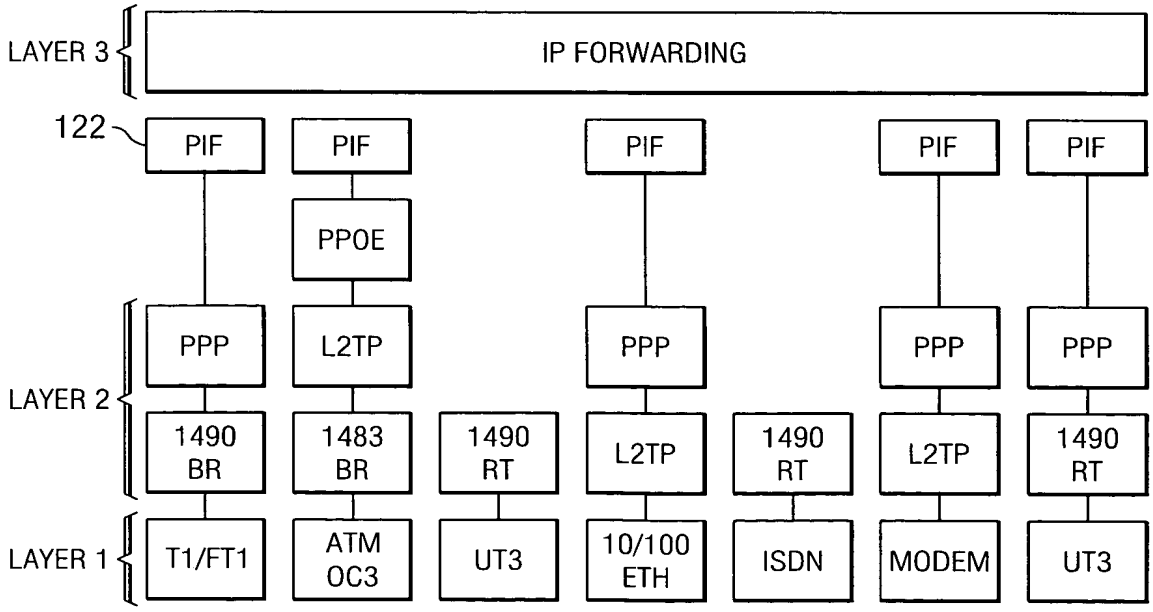


FIG. 28



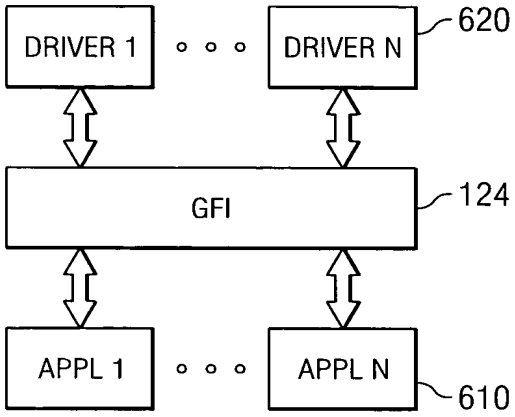

DRIVER 1
DRIVER N
620
GFI
124
APPL 1
APPL N
610

FIG. 29

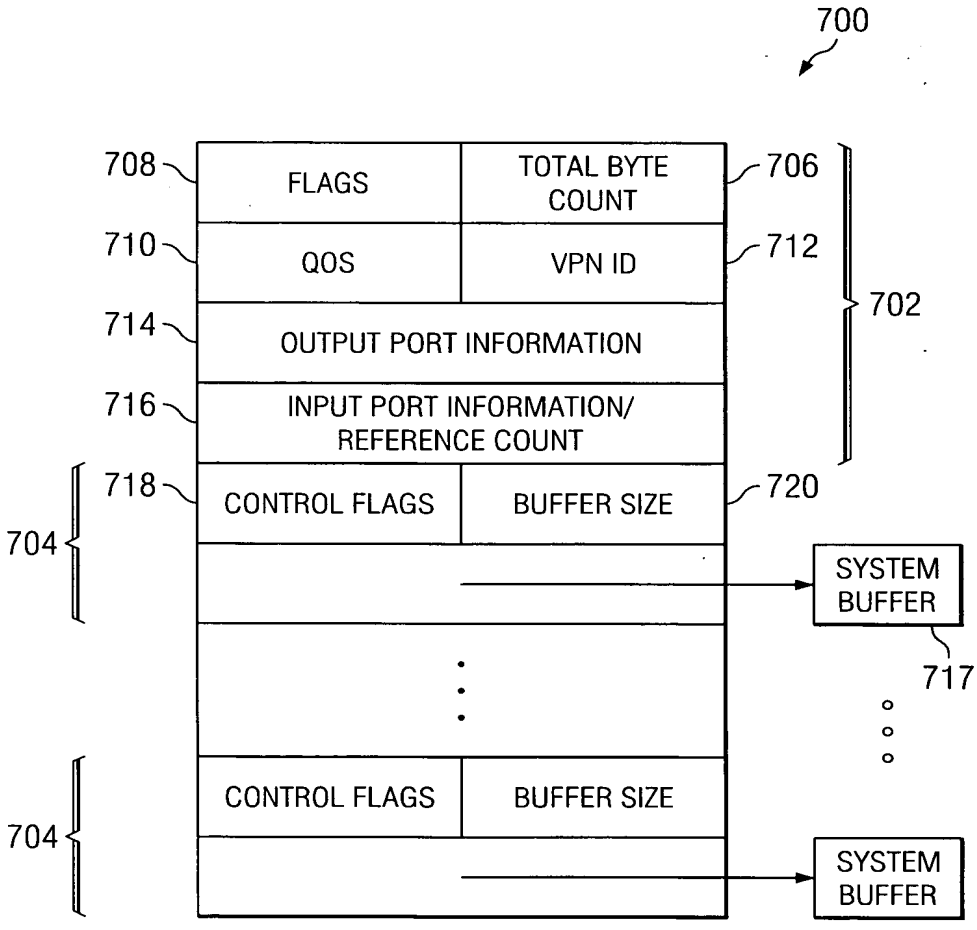

700
708
FLAGS
TOTAL BYTE COUNT
706
710
QOS
VPN ID
712
702
714
OUTPUT PORT INFORMATION
716
INPUT PORT INFORMATION/ REFERENCE COUNT
718
CONTROL FLAGS
BUFFER SIZE
720
704
SYSTEM BUFFER
717
CONTROL FLAGS
BUFFER SIZE
704
SYSTEM BUFFER

FIG. 30

FIG. 31

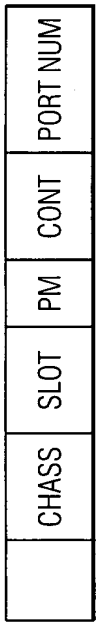


FIG. 32

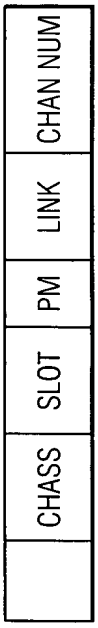


FIG. 33

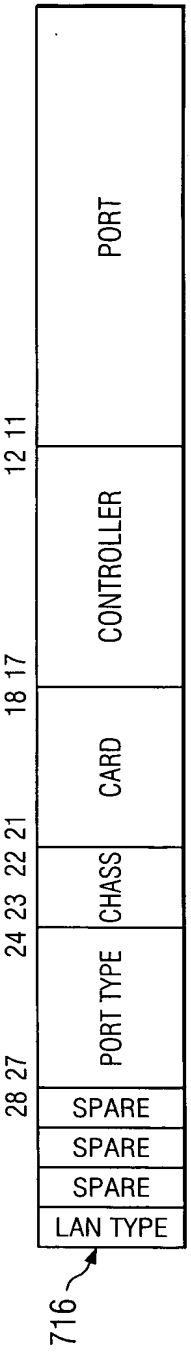
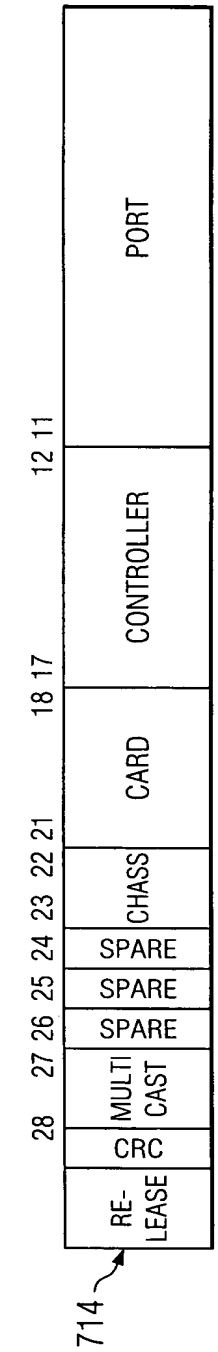


FIG. 34



PORT ADDR RANGE	TYPE	CHASS	CARD	CONTROL
0-19	WELL KNOWN INTERNAL MULTICAST ADDRESS	NA	NA	0
20-30	WELL KNOWN NAME MULTICAST ADDRESS	NA	CARD NUM	0
40-79	WELL KNOWN EXTERNAL MULTICAST ADDRESS	NA	NA	0
80-511	DYNAMIC EXTERNAL MULTICAST ADDRESS	NA	NA	0
512-2048	RENAME PORT ADDRESS	CHASS NUM	CARD NUM	0

FIG. 35

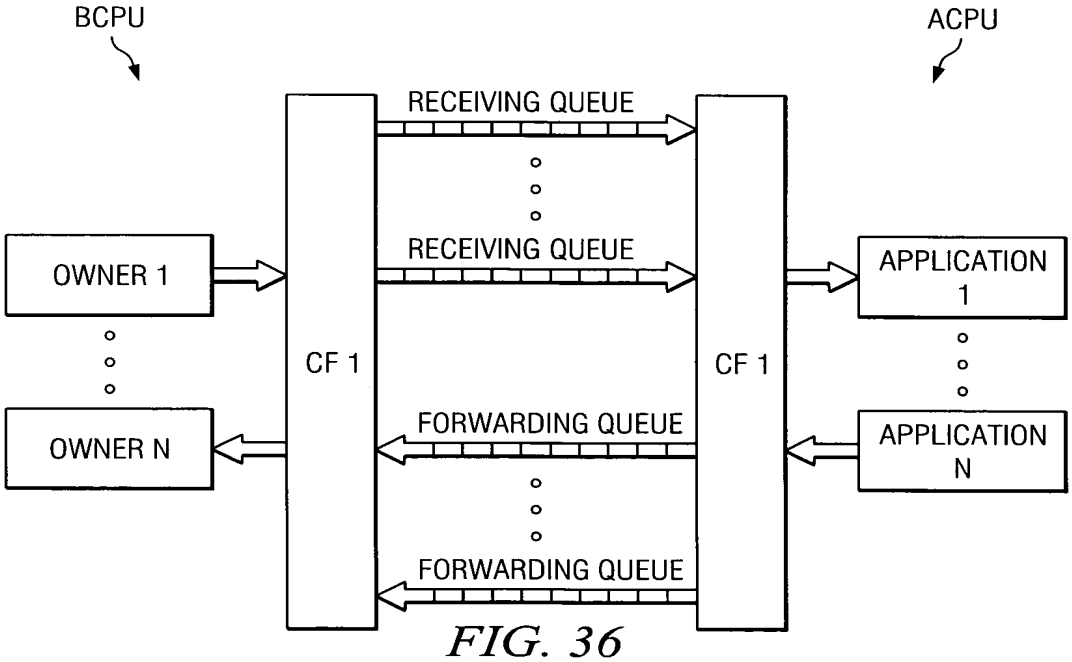


FIG. 36